



**PATENT**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Applicant: Kwon, Byoung

Examiner: C. Kaufman

Serial No.: 08/948,764

Group Art Unit: 1646

Filed: October 10, 1997

Docket: 740.012US2

Title: NEW RECEPTOR AND RELATED PRODUCTS AND METHODS

**SUPPLEMENTAL DECLARATION UNDER 37 C.F.R. § 1.131(b)**

Assistant Commissioner for Patents  
Washington, D.C. 20231

Sir:

I, Byoung Kwon declare and say as follows:

1. I am the named inventor of the subject matter claimed in the above-identified patent application, U.S. application Serial No. 08/948,764, filed on October 10, 1997.

2. I received a Certificate in 1968, a D.D.S. in 1972, and a M.S. in Microbiology in 1974, from Seoul National University, Seoul, Korea. In 1981, I received a Ph.D. in microbiology from the Medical College of Georgia, Augusta, Georgia. From 1981-1984, I was a postdoctoral fellow in the Department of Human Genetics at Yale University School of Medicine, New Haven, Connecticut. I was the Head of Medical Genetics at the Guthrie Research Institute, Sayre, Pennsylvania, from 1984-1988. From 1988-1993, I was an Associate Professor in the Department of Microbiology and Immunology, Indiana University School of Medicine, Indianapolis, Indiana. From 1993-1999, I was a Professor in that same Department. I am currently a Professor at Louisiana State University. I have authored or co-authored over 100 papers, primarily in the areas of the molecular basis for pigmentation and the identification and characterization of molecules involved in lymphocyte activation and proliferation.

3. I have reviewed the Goodwin et al. patent (U.S. Patent No. 5,674,704) and Schwarz et al. (Genbank Accession No: L12964) cited by the Examiner in the final Office Action dated January 12, 1999, and the Advisory Action dated July 30, 1999 and make this Declaration in support of the patentability of the claims of U.S. patent application Serial No. 08/948,764.

4. Prior to the April 22, 1993 publication date of Schwarz et al. and the May 7, 1993 filing date of the parent application to the Goodwin et al. patent, I had isolated and purified a portion of a human 4-1BB (H4-1BB) gene and thereafter proceeded diligently to characterize the full length gene. Also prior to the effective date of Schwarz et al. and the effective date of the Goodwin et al. patent, I had prepared DNA encoding a fusion protein comprising the extracellular domain of H4-1BB.

5. Schwarz et al. disclose the nucleotide sequence and inferred amino acid sequence of a human cDNA termed ILA. The nucleotide sequence of ILA encodes a polypeptide that has a single amino acid substitution relative to SEQ ID NO:2 of the present application.

6. The Goodwin et al. patent discloses an amino acid sequence of a H4-1BB polypeptide which is identical to the H4-1BB amino acid sequence disclosed in the above-identified application. Example 3 of the Goodwin et al. patent describes the preparation of DNA encoding a fusion protein that includes the 186 amino acids of H4-1BB including the signal sequence fused to Fc.

7. Exhibit A, attached hereto and incorporated by reference herein, is submitted as factual evidence of the reduction to practice of the invention in the United States prior to the effective date of the above-mentioned references.

8. As factual evidence that the invention was reduced to practice in the United States prior to the effective dates of Schwarz et al. and Goodwin et al., Exhibit A is a photocopy of certain pages from a laboratory notebook. The 5' portion of the H4-1BB cDNA, including sequences encoding the signal peptide and the entire extracellular domain, was amplified by a polymerase chain reaction (PCR) with two primers termed 5' and 3'. The 5' primer included a BglII site at the 5' end of the primer, and the 3' primer included a HindIII site at the 5' end of the 3' primer, to facilitate directional and positional cloning into a mammalian expression vector, APTag-1, that had been digested with BglII and HindIII. The sequence of the 5' primer was: 5' ATAGATCTATGGGAAACAGCTGTTAC 3', and the sequence of the 3' primer was: 5'

ATAAGCTTCGGAGAGTGTCTGGCTC 3'. The introduction of the BglII-HindIII digested H4-1BB fragment into BglII-HindIII digested APTag-1 results in the introduction of the coding sequence of H4-1BB upstream of the coding sequence for human placental alkaline phosphatase (AP). Sheet 1 of Exhibit A indicates the reaction conditions employed to digest the amplified H4-1BB product with BglII and HindIII and to digest APTag-1 with those same enzymes. A portion of the products from these reactions were subjected to agarose gel electrophoresis. Sheet 2 of Exhibit A shows a photograph of that gel. The lane closest to the top of the sheet has the product(s) from the digestion of APTag-1 with HindIII and BglII while the lane beneath that lane has the product(s) from the digestion of the amplified H4-1BB product with HindIII and BglII. To prepare an expression vector comprising DNA encoding a fusion protein comprising an N-terminal portion of H4-1BB and AP, the products shown on the gel were ligated. The ligation reaction mixture is described on sheet 3 of Exhibit A. The experiments which produced Exhibit A were performed in my laboratory at Indiana University, Indianapolis, Indiana, USA. The material in Exhibit A which has been deemed to be irrelevant to evidence supporting the conception of the invention claimed in the above-identified application has been masked out on Exhibit A. Exhibit A is dated prior to April 22, 1993 (date masked out).

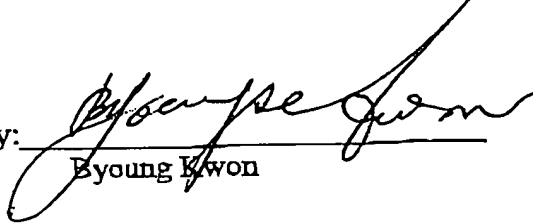
9. In order to prepare a fusion protein in which a portion of H4-1BB was linked in frame to AP, it is logical to conclude that the nucleotide sequence of H4-1BB was known. In particular, the amplification of a portion of the nucleic acid sequence of H4-1BB with primers, the selection of restriction enzymes that do not cleave DNA in the portion of the nucleic acid sequence of H4-1BB to be inserted into an expression vector, and the introduction of the digested DNA so that the coding sequence is linked in frame with the coding sequence of another protein, shows that the nucleotide sequence of H4-1BB was available. Thus, Exhibit A demonstrates that the invention claimed in the present application was reduced to practice prior to the effective date of Schwarz et al., i.e., April 22, 1993, and Goodwin et al., i.e., May 7, 1993.

10. I further declare that all statements made herein of my own knowledge are true, and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made

are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Dated: 1/3/2008

By:

  
Byoung Kwon

Consecutive digestion of APTag/Bgl II - Hind III

Bgl II digestion 0.19 ml

water 1.7 ml

React I 2 ml

Hind III 2 ml

40 ml at 37°C

(purify by elutip method)

05:00

digestion of 4-18B PCR products

4-18B (5' 3') 16 ml

React 3 2 ml

spendia 1 ml

Bgl II 1 ml

20 ml

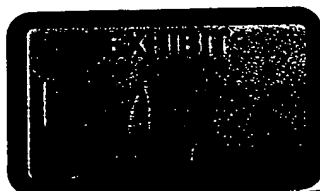
at 37°C 05:00

React 4 2 ml

water 16 ml

Hind III 2 ml

40 ml



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APR 11 1968  
[REDACTED]

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EXHIBIT  
A  
SHEET 2

Legation

APtag / HindIII - B3/II (150 ng /  $\mu$ l)

4-1 BB (PCR) / HindIII - B3/II (8 ng /  $\mu$ l)

5X buffer

water

ligase

exp.

1  $\mu$ l

2  $\mu$ l

2  $\mu$ l

4.5

0.5

10  $\mu$ l

self

1  $\mu$ l

—

2  $\mu$ l

6.5

0.5  $\mu$ l

10  $\mu$ l

f)



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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Attorney Docket No.: 740.013US3 (IU-0030)  
Inventors: Kwon, Byoung S.  
Serial No.: 10/027,199  
Filing Date: December 20, 2001  
Examiner: Landsman, Robert S.  
Customer No.: 26259  
Group Art Unit: 1647  
Confirmation No.: 2369  
Title: Receptor and Related Products and Methods

"Express Mail" Label No. EV593364199US

Date of Deposit December 23, 2004

I hereby certify that this paper is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to the Mail Stop Fee Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

By Jane Massey Licata

Typed Name: Jane Massey Licata, Reg. No. 32,257

Mail Stop Fee Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir:

**AFFIDAVIT**

In accordance with the conditions set forth by the Budapest Treaty the undersigned attorney of record hereby states, and affirms that:

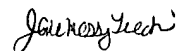
(a) The *Escherichia coli* Human 4-1BBcDNA(pH4-1BB) related to the above referenced application has been deposited with, and accepted by an International Depository Authority under the provisions of the Budapest Treaty. The deposit was made on August 25, 1993 to the Agricultural Research Culture Collection (NRRL), International



Depository Authority, 1815 N. University Street, Peoria, IL 61604. The Accession Number given by the International Depository Authority is NRRL B-21131. All restrictions upon public access to this cell line will be irrevocably removed upon grant of a patent on this above referenced application. The Deposit will be maintained in a public depository for a period of thirty years after the date of deposit or five years after the last request for a sample or for the enforceable life of the patent, whichever is longer. The above-referenced cell line was viable at the time of the deposit. The Deposit will be replaced if viable samples cannot be dispensed by the depository.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Respectfully submitted,



Jane Massey Licata  
Registration No. 32,257

Date: December 23, 2004

Licata & Tyrrell P.C.  
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BUDAPEST TREATY ON THE INTERNATIONAL  
RECOGNITION OF THE DEPOSIT OF MICROORGANISMS  
FOR THE PURPOSE OF PATENT PROCEDURES

INTERNATIONAL FORM

TO Dr. Bjong Kwon  
Dept. of Microbiology & Immunology  
Indiana University School  
of Medicine  
635 Barnhill Drive, Room 255  
Indianapolis, IN 46202-5120  
NAME AND ADDRESS  
OF DEPOSITOR

RECEIPT IN THE CASE OF AN ORIGINAL DEPOSIT  
issued pursuant to Rule 7.1 by the  
INTERNATIONAL DEPOSITARY AUTHORITY  
identified at the bottom of this page

I. IDENTIFICATION OF THE MICROORGANISM

Identification reference given by the  
DEPOSITOR:

*Escherichia coli*  
Human 4-1BBcDNA(pH4-1BB)

Accession number given by the  
INTERNATIONAL DEPOSITARY AUTHORITY:

NRRL B-21131

II. SCIENTIFIC DESCRIPTION AND/OR PROPOSED TAXONOMIC DESIGNATION

The microorganism identified under I. above was accompanied by:

- ☐ a scientific description  
☒ a proposed taxonomic designation

(Mark with a cross where applicable)

III. RECEIPT AND ACCEPTANCE

This International Depositary Authority accepts the microorganism identified under I.  
above, which was received by it on August 25, 1993 (date of the original deposit)<sup>1</sup>

IV. RECEIPT OF REQUEST FOR CONVERSION

The microorganism identified under I. above was received by this International  
Depositary Authority on (date of the original deposit) and  
a request to convert the original deposit to a deposit under the Budapest Treaty  
was received by it on (date of receipt of request for conversion)

V. INTERNATIONAL DEPOSITARY AUTHORITY

Name: Agricultural Research Culture  
Collection (NRRL)  
International Depositary Authority  
Address: 1815 N. University Street  
Peoria, Illinois 61604 U.S.A.

Signature(s) of person(s) having the power  
to represent the International Depositary  
Authority or of authorized official(s):

Date:

9-30-93

<sup>1</sup> Where Rule 6.4(d) applies, such date is the date on which the status of international  
depositary authority was acquired.